

## Claims

- [c1] An xDSL interconnecting device for interconnecting a first analog line and a second analog line, comprising:
- a first analog transmit/receive unit, connecting to said first analog line, operable to transmit an analog signal having a first frequency band to said first analog line and to receive an analog signal having a second frequency band higher than said first frequency band from said first analog line;
  - a second analog transmit/receive unit, connecting to said second analog line, operable to transmit an analog signal having said second frequency band to said second analog line and to receive an analog signal having said first frequency band from said second analog line; and
  - an interconnecting unit, connected to said first analog transmit/receive unit and said second analog transmit/receive unit, operable to interconnect communication between said first analog transmit/receive unit and said second transmit/receive unit.
- [c2] An xDSL interconnecting device as claimed in claim 1, wherein said first analog transmit/receive unit comprises:
- a first combine/separate circuit operable to separate a transmitted signal and a received signal that are superposed on said first analog line from each other;
  - a first AD converter operable to convert an analog signal obtained from said first combine/separate circuit to a digital signal to supply said digital signal to said interconnecting unit; and
  - a first DA converter operable to convert a digital signal obtained from said interconnecting unit to an analog signal to supply said analog signal to said first combine/separate circuit, and
- wherein said second analog transmit/receive unit includes:
- a second combine/separate circuit operable to separate a transmitted signal and a received signal that are superposed on said second analog line from each other;
  - a second AD converter operable to convert an analog signal obtained from said second combine/separate circuit to a digital signal to supply said digital signal to said interconnecting unit; and

a second DA converter operable to convert a digital signal obtained from said interconnecting unit to an analog signal to supply said analog signal to said second combine/separate circuit.

[c3] An xDSL interconnecting device as claimed in claim 1, wherein a plurality of first analog transmit/receive units and a plurality of second analog transmit/receive units are provided, and  
said interconnecting unit controls routings between said plurality of first analog transmit/receive units and said plurality of second analog transmit/receive units.

[c4] An xDSL interconnecting device as claimed in claim 1, wherein said first analog transmit/receive unit transmits an analog signal having a first partial frequency band of said first frequency band and receives an analog signal having a second partial frequency band of said second frequency band, and  
said second analog transmit/receive unit transmits data received by said first analog transmit/receive unit in said second partial frequency band, as an analog signal having a third partial frequency band of said second frequency band and receives data to be transmitted by said first analog transmit/receive unit in said first partial frequency band, as an analog signal having a fourth partial frequency band of said first frequency band.

[c5] An xDSL interconnecting device as claimed in claim 1, wherein said first analog transmit/receive unit and said second analog transmit/receive unit are provided on different circuit boards, respectively.

[c6] An xDSL interconnecting device as claimed in claim 1, wherein a plurality of first analog transmit/receive units are respectively provided on different circuit boards,  
a plurality of second analog transmit/receive units are respectively provided on different circuit boards, and  
said circuit boards where said first analog transmit/receive units are provided and said circuit boards where said second analog transmit/receive units are provided are alternately arranged.

- [c7] An xDSL interconnecting device as claimed in claim 1, further comprising:  
a power supply operable to supply power to said first analog transmit/receive unit and said second analog transmit/receive unit; and  
a first noise filter provided between said power supply and said first analog transmit/receive unit.
- [c8] An xDSL interconnecting device as claimed in claim 7, further comprising a second noise filter provided between said power supply and said second analog transmit/receive unit.
- [c9] An xDSL interconnecting device as claimed in claim 1, further comprising a low-pass filter, provided on wiring connecting said first analog line and said second analog line, operable to supply an analog signal transmitted through said first analog line to said second analog line after reducing high frequency components thereof and to supply an analog signal transmitted through said second analog line to said first analog line after reducing high frequency components thereof.
- [c10] An xDSL interconnecting device as claimed in claim 1, further comprising a first splitter provided between said first analog line and said first analog transmit/receive unit; and  
a second splitter provided between said second analog line and said second analog transmit/receive unit, and wherein  
said first splitter extracts, from an analog signal obtained via said first analog line, an analog signal having a third frequency band lower than said second frequency band, supplies an analog signal having said second frequency band to said first analog transmit/receive unit, supplies said analog signal having said third frequency band to said second splitter, and combines an analog signal transmitted by said first analog transmit/receive unit with an analog signal obtained from said second splitter to output them to said first analog line, and  
said second splitter extracts from, an analog signal obtained from said second analog line, an analog signal having said third frequency band lower than said first frequency band, supplies an analog signal having said first frequency band

to said second analog transmit/receive unit, supplies said analog signal having said third frequency band to said first splitter, and combines an analog signal transmitted by said second analog transmit/receive unit with an analog signal obtained from said first splitter to output them to said second analog line.

[c11] An xDSL interconnecting device further comprising a digital transmit/receive unit, connected to a digital line, operable to transmit/receive a digital signal, wherein

said interconnecting unit is further connected to said digital transmit/receive unit and interconnects communication between said first analog transmit/receive unit and said digital transmit/receive unit.

[c12] A communication system comprising:

an xDSL concentrator operable to convert a received digital signal to an analog signal to output said analog signal;

an xDSL interconnecting device operable to receive from a first analog line said analog signal output by said xDSL concentrator to output said analog signal to a second analog line; and

an xDSL converter operable to convert said analog signal output by said xDSL interconnecting device to a digital signal to transmit said digital signal to a users terminal, wherein

said xDSL interconnecting device includes:

a first analog transmit/receive unit, connected to said first analog line, operable to transmit an analog signal having a first frequency band to said first analog line and to receive an analog signal having a second frequency band higher than said first frequency band from said first analog line;

a second analog transmit/receive unit, connected to said second analog line, operable to transmit an analog signal having said second frequency band to said second analog line and to receive an analog signal having said first frequency band from said second analog line; and

an interconnecting unit, connected to said first analog transmit/receive unit and said second analog transmit/receive unit, operable to interconnect communication between said first analog transmit/receive unit and said second analog transmit/receive unit.